UNIVERSITI TEKNOLOGI MARA

QUANTIFICATION OF WATER LOSS FOR MUDA AGRICULTURAL DEVELOPMENT AUTHORITY CENTRAL CANAL

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Candidate's Declaration

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledge as referenced work. This topic has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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ABSTRACT

MADA Water Management Division reports that based on the daily water management report for Season II/2004(WMSmusim II/2004), a substantial amount of water of about 400 – 700 cubic ft/sec (cusec) was 'lost' along the stretch of Lembaga Kemajuan Pertanian Muda's (MADA) Central Canal between Senara Regulator to Guar Kepayang Regulator, located in the district of Pendang. This resulted in the drop of water level along the Central Canal, consequently resulting in the 'breakdown' or ineffective performance for the whole distribution systems which depended on this canal. The inadequate water supply to the crops will delay the time for the water to fill up the field. This ineffectiveness of water supply can cause many problems such as water stress to the paddy plant, problems with weeds, ineffective fertilizing including social problems such as vandalism and social conflict. It is initially presumed that the cause for the water loss could be due to seepage at the irrigation siphon across Sungai Tiang Gerap or at the drainage culvert at Sungai Padang Kerbau. The other possible reasons could be due to the over tapping by the offtakes, illegal tapping by the Illegal Siphon Pipes (ISP) or due to the incorrect regulator gate operations. The objective of the study is to quantify the amount of water 'loss' along the Central Canal during the supply period. This unaccounted amount of water is determined by establishing a water balance model by monitoring, collecting and analyzing the field data. Recommendations on measures to improve the efficiency of the water distribution system will also be given. The nature of the study will depend mostly on field data collection, extensive monitoring and measurement of field investigation. Based on these data, a modified model based on the conceptual Water Balance Equation (3) of the system is then established. This is to help calibrate and validate the data obtained. Data are collected during the supply season for the water levels, rainfall, discharge and evaporation. Results of the analysis on the water levels at both the rivers have shown that there is no evidence of seepage occurring at both sites. The results also show that the percentage contribution by the offtakes and the illegal siphon pipes in the water balance equation is very small compared to the percentage contribution by the Guar Kepayang regulators. It was concluded that the later is the major contributing factor to the water loss. The observed results and the results from the model are than calibrated and validated.

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CHAPTER 1

INTRODUCTION

This chapter explains in general about the study and factors that are concerned with it. It also states the objectives and describes the problem statements. The scope of the study and the limits are also described in this chapter, along with the significance or benefits.

1.0 Irrigation in General

Agriculture currently consumes 70% of the world's developed fresh water supplies and in Malaysia, more than 80% of the country's water demand is used for agriculture (Mohd Azhari Ghazalli & Teoh, 1996). With the current rate of economic and population growth, competition for water is inevitable. The irrigation sector, while having to increase its food production, must however be more efficient in its resource utilization as well as raising its effective standards in its water management systems. This too would be in line with the Third National Agriculture Policy (NAP3, 1998 – 2010) which stipulates that Agriculture play a more strategic role in addressing the country's development issues by focusing on new approaches to increase productivity to enhance food security (PMR, 2008).

Even though the Malaysian government has given emphasis on the major role that agriculture contributes to national development but due to the rapid growth of industries and population increase at a rate of about 12% annually, the water demand for the domestic and industrial sectors is expected to surpass the water demand by the agriculture